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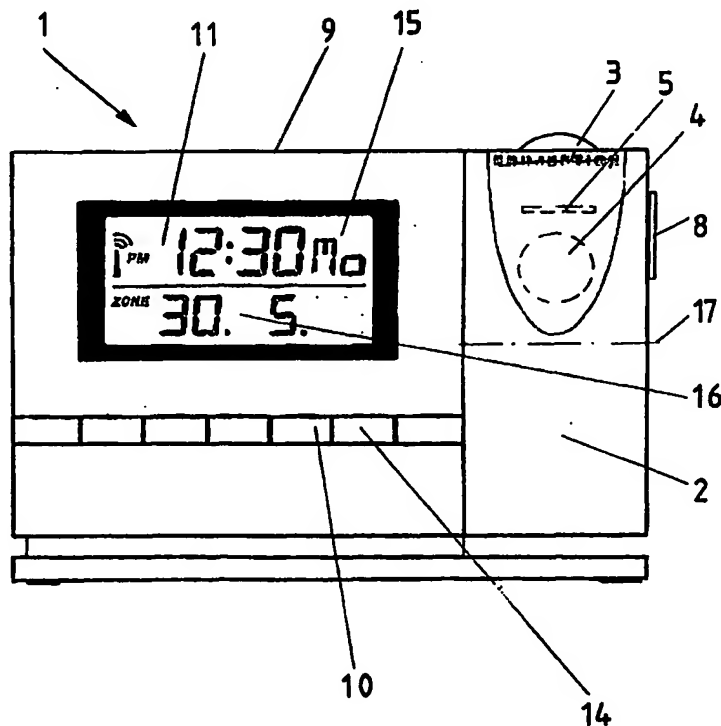
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(21) International Application Number: PCT/EP97/03182 (22) International Filing Date: 18 June 1997 (18.06.97) (71) Applicant (for all designated States except US): IDT-LCD HOLDINGS (BVI) LTD. (IDT-BVI) [-/-]; Trident Chambers, P.O. Box 146, Road Town, Tortola (VG). (72) Inventor; and (75) Inventor/Applicant (for US only): CHAN, Raymond [GB/GB]; Apartment B10, Woodland Heights, 2 Wong Nei Chung Gap Road, Hong Kong (CN). (74) Agent: LUSUARDI, Werther; Dr. Lusuardi AG, Kreuzbühlstrasse 8, CH-8008 Zürich (CH).		(81) Designated States: JP, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  Published With international search report.

(54) Title: PROJECTION CLOCK

(57) Abstract

Apparatus for projection of a liquid crystal display (5) of a clock (1) to a smooth surface, where the clock (1) comprises a casing (9) and a projection device (2) which is moveable relative to the casing (9) and provides a light source (4), a liquid crystal display (5) and a spherical lens (3), characterised in that the projection device (2) is based on the transmitted light principle, where the light source (4), the liquid crystal display (5) and a focusable, spherical lens (3) are sequentially arranged along the light beam permitting the projection of the liquid crystal display (5) into a real image.



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Projection Clock

The invention relates to an apparatus for projection of a liquid crystal display of clock to a smooth surface according to the prior art part of claim 1.

The disadvantages of former similar dispositions are principally reasoned therein that the use of incandescent bulbs only permits a short lastingness in case of continuous duty and so far no projection clock coupled with a radio clock is available.

Hereto, the invention seeks to offer remedy. The purpose of the invention is to project the display of a clock comprising a projection device to any smooth surface. Therefore, the projection clock provides a moveable projection device. Furthermore, the projection clock may provide a time display based on a clock synchronized by a DCF-77 signal - a so called radio clock - and provides an alarm. The projection device is focusable and permits a focusing of the projected image to walls having a different distance or to ceilings having a diverse height. Thus, different set-up heights of the projection clock may be compensated by adjusting the lens. The use of a super bright light-emitting diode with collimator-cage as projection

light source also causes a significant increase of the lastingness of the projection light source compared to the former applied incandescent bulbs with halogen filling.

The invention solves the posed task by using an apparatus which embodies the features of claim 1.

An other advantageous embodiment of the invention is the translatability of the projecting lens in an axial direction by means of a knurled turning knob. Therewith the projecting lens is easily focusable and permits a focusing of the projected image at walls or ceilings.

The advantages of the invention are particularly based on the focusability of the lens through which the projection clock may be placed on an arbitrary level and may be used with different heights of a ceiling. Furthermore, the apparatus according to the invention permits the projection of a clock coupled with a radio clock at a wall or a ceiling.

Additional features and advantages of the invention will be discussed in the detailed description with accompanying drawings.

Brief description of the drawings:

Fig. 1 shows a top view of the projection clock according to one implementation of the invention;

Fig. 2 illustrates a front view of the projection clock according to one implementation of the invention.

Fig. 1 illustrates the projection clock comprising a clock 1 and a projection device 2. The projection device 2 is based on the transmitted light principle and comprises a light source 4, a miniature liquid crystal display 5 which is to be projected and a spherical lens 3. The light source 4, the miniature liquid crystal display 5 and the spherical lens 3 are sequentially arranged along the light beam permitting a projection of the miniature liquid crystal display 5 into a real image. Moreover, the projection device 2 is moveable mounted and provided with a knurled turning knob 8 permitting a focussing of the spherical lens 3. The clock 1 and the projection device are provided with two batteries 12, but optionally an AC-power unit 13 with a 3 V DC low tension side may be connected.

Fig. 2 shows a front view which illustrates the clock 1 with the projection device 2 which is moveable relative to the casing 9 of the clock 1 around the axis of rotation 17 which connects the casing 9 and the clock 1. The knurled turning knob 8 at the projection device 2 serves to translate the lens 3 in an axial direction and therewith focus the spherical lens 3. The display 11 of the clock 1 optionally provides a 24 h or a 12 h time display which may be chosen by a press switch 14. Apart from this a display 15 of the week-day and a display 16 of the date is integrated in the display 11 of the clock 9. Moreover, an

alarm function, preferably providing an acoustical signal can be controlled by the press switch 14 which is integrated in the clock 1.

Claims

1. Apparatus for projection of a liquid crystal display (5) of a clock (1) to a smooth surface, whereby the clock (1) comprises a casing (9) and a projection device (2), said projection device (2) comprising a light source (4), a liquid crystal display (5) and a lens (3), characterised in that the projection device (2) is based on the transmitted light principle, where the light source (4), the liquid crystal display (5) which is to be projected and the lens (3) are sequentially arranged along the light beam permitting the projection of a real image and that the projection device (2) is moveably connected to the casing (9) of the clock (1).
2. Apparatus according to claim 1, characterised in that the lens (3) is focusable.
3. Apparatus according to claim 1 or 2, characterised in that the lens (3) is translatable in the axial direction, preferably by means of a knurled turning knob (8) and therewith focusable.
4. Apparatus according to one of the claims 1 to 3, characterised in that the lens (3) is spherical.
5. Apparatus according to one of the claims 1 to 4, characterised in that the clock (1) is preferably synchronized on the basis of a DCF-77-signal as a radio clock.

6. Apparatus according to one of the claims 1 to 5, characterised in that the clock (1) is provided with two batteries (12), preferably of the size UM3 or "AA".

7. Apparatus according to one of the claims 1 to 6, characterised in that a AC-power unit (13) is connectable to the clock (1) and the projection device (2), preferably one which is provided with a 3 V DC low tension side.

8. Apparatus according to one of the claims 1 to 7, characterised in that the clock (1) provides an alarm signal(10), preferably an acoustical signal.

9. Apparatus according to one of the claims 1 to 8, characterised in that the display (11) of the clock (1) selectively shows a 24-hour reading or a 12-hour reading.

10. Apparatus according to one of the claims 1 to 9, characterised in that a super bright light-emitting diode is used as light source (4).

11. Apparatus according to one of the claims 1 to 10, characterised in that the projection device (2) is turnable relative to the casing (9) of the clock (1) by rotating it around the axis of rotation (17) which connects the clock (1) and the projection device (2).

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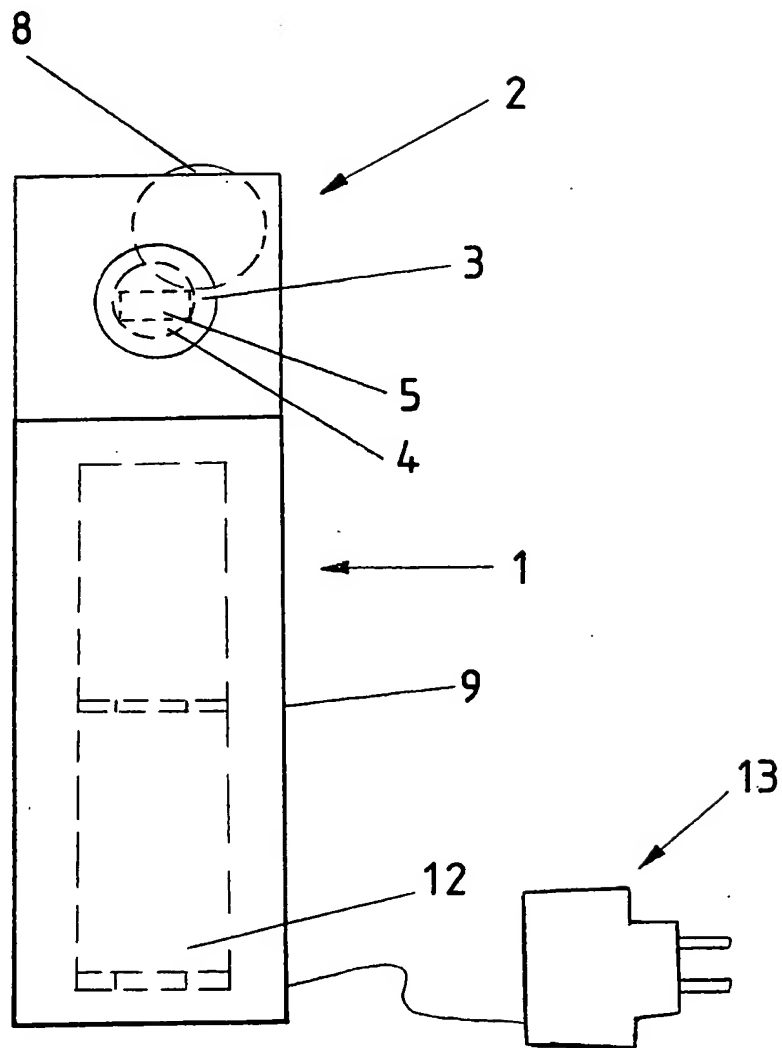


Fig.1

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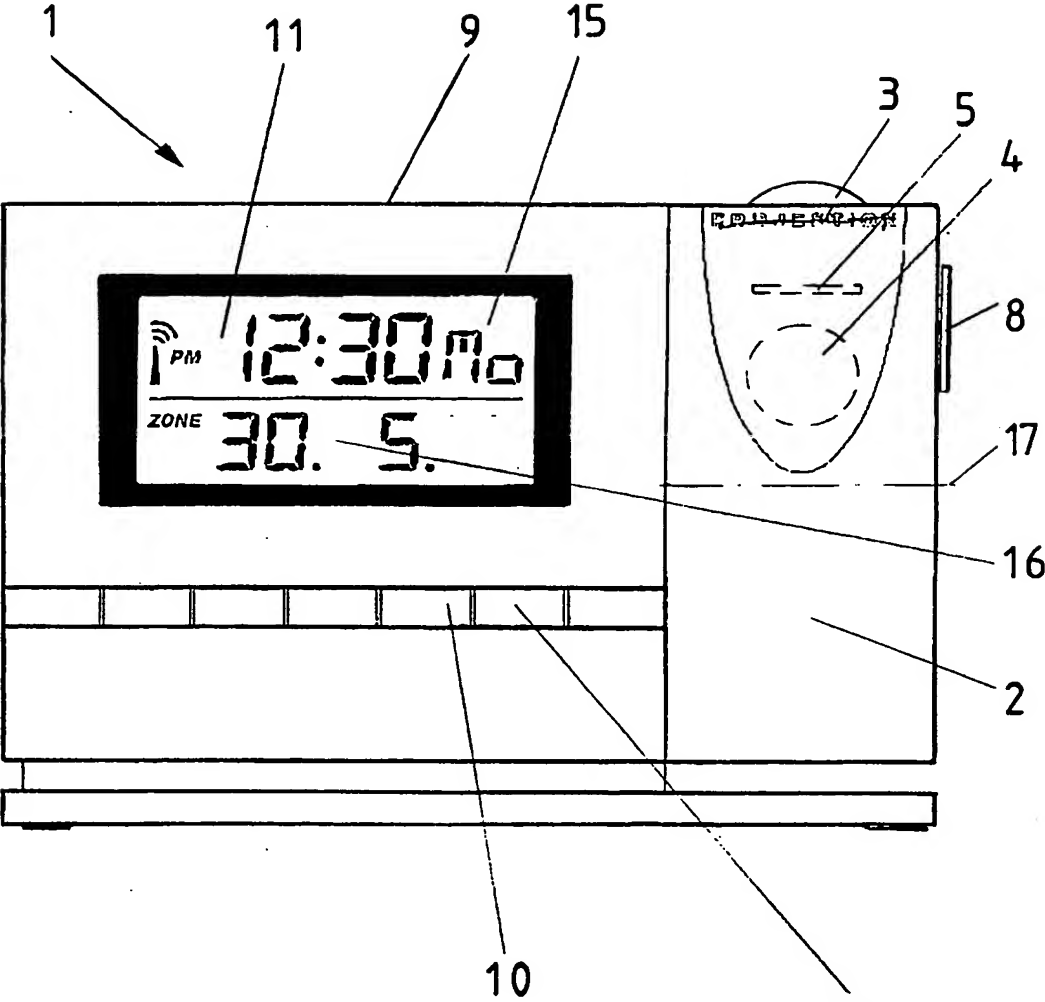


Fig. 2

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 97/03182

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G04B19/34

According to International Patent Classification(IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 036 946 A (ESGE ELEKTROUHREN GMBH) 7 October 1981 see the whole document	1,4
Y A	FR 2 633 070 A (RIGAL) 22 December 1989 see page 1, line 1 - page 4, line 23; figure 8	1,4 2,3
A	FR 1 605 562 A (BATRIAUD-DELAUTRE) 3 April 1981 see the whole document	1-4,6,7
A	WO 92 18914 A (MAURER) 29 October 1992 see claim 1	1-3,11
A	US 5 260 919 A (TSAI) 9 November 1993 see the whole document	1-3,8,10
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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24/03/1998

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
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A	GB 440 444 A (RAYNOR) 30 January 1936 see page 1, line 6 - line 23; figure 1 -----	9

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Information on patent family members

International Application No

PCT/EP 97/03182

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